Anatomical Description of the Foot of a Chinese Female. *By* Bransby Blake Cooper, *Esq., Surgeon to Guy's Hospital. Communicated by* Peter Mark Roget, *M.D. Sec. R.S.* Read March 5, 1829. [*Phil. Trans.* 1829, *p.* 255.]

The foot, of which an account is here given, was obtained from the dead body of a female found floating in the river at Canton, and had all the characters of deformity, consequent upon the prevailing practice of early bandaging, for the purpose of checking its natural growth. To an unpractised eye, it has more the appearance of a congenital malformation, than of being the effect of art, however long continued; and appears at first sight like a club-foot, or an unreduced dislocation. From the heel to the great toe, the length of the foot measures only five inches; the great toe is bent abruptly backwards, and its extremity points directly upwards, while the phalanges of the other toes are doubled in beneath the sole of the foot, leaving scarcely any breadth across the foot, where it is naturally broadest. The heel, instead of projecting backwards, descends in a straight line from the bones of the leg, and imparts a singular appearance to the foot, as if it were kept in a state of permanent extension. From the doubling in of the toes into the sole of the foot, the external edge of the foot is formed in a great measure by the extremities of the metatarsal bones, and a deep cleft or hollow appears in the sole of the foot, across its whole breadth. The author gives a minute anatomical description of all these parts, pointing out the deviations from the natural conformation. He remarks that from the diminutive size of the foot, the height of the instep, the deficiency of breadth, and the density of the cellular texture of the foot, all attempts to walk with so deformed a foot, must be extremely awkward; and that in order to preserve an equilibrium in an erect position, the body must necessarily be bent forwards with a painful effort, and with a very considerable exertion of muscular power.

Some Observations on the Functions of the Nervous System, and the relation which they bear to the other vital Functions. *By* Alexander Philip Wilson Philip, *M.D. F.R.S. L. & E.* Read April 2, 1829. [*Phil. Trans.* 1829, *p.* 261.]

The intention of the author in the present paper, is, not to bring forwards any new facts, but to take a general review of the inferences deducible from the series of facts detailed by him in previous papers communicated to this Society. He divides the nerves into two classes, essentially differing in their functions. The first comprehends those nerves, which, proceeding directly from the brain and spinal cord to other parts, convey in the one case to those parts the influence of those organs only from which they originate, and thus excite to contraction the muscles of voluntary motion; and in the other case transmit to the sensorium impressions made on the parts to which they are distributed. The second class comprises what may be

termed the Ganglionic nerves, or those which enter ganglions, properly so called; that term being limited to such protuberances only as receive branches of nerves proceeding from the brain and spiral cord. These nerves are distributed more especially to the vital organs, as the thoracic and abdominal viscera, and to the muscles subservient to their functions. The nerves belonging to this class also convey impressions to the sensorium, and occasionally excite the muscles of involuntary motion, which, in common with all muscles, possess an inherent power of contractility dependent solely on their own mechanism, and which in ordinary cases are excited by stimuli peculiar to themselves. But the most important function of the ganglionic nerves, is that of supporting the processes of secretion and assimilation, which require for their performance the combined influence of the whole brain and spinal cord. Viewed as a whole, the system of ganglionic nerves, therefore, constitutes, in the strictest sense, a vital organ. Thus the sensorium, though connected by means of the cerebral and spinal nerves only partially with the organs of sense and voluntary motion, is, by means of the ganglionic nerves, connected generally with all the functions of the animal body. Hence affections of the stomach and other vital organs extend their influence over every part of the frame; while those of a muscle of voluntary motion, or even of an organ of sense, although possessing greater sensibility, are confined to the injured part.

From a due consideration of the phenomena of the nervous system, it would appear that they imply the operation of more than one principle of action. The sensorial power is wholly distinct from the nervous power; the former residing chiefly in the brain, while the latter belongs equally to the spinal cord and brain, and may be exercised independently of the sensorial power. In like manner, the muscular power resides in the muscles, and may be called into action by various irritations independently of the nervous power, though frequently excited by the action of that power. The muscles of voluntary motion are subjected to the sensorial power through the intervention of the nervous system; and those of involuntary motion are also, under certain circumstances, capable of being excited through the nerves by the sensorial power, particularly when under the influence of the passions. The same observation applies also to other actions which properly belong to the nervous power, such as the evolution of caloric from the blood, and the various processes of secretion and of assimilation. That the nervous power is in these instances merely the agent of other powers, and is independent of the peculiar organization of the nerves, is proved by the same effects being produced by galvanism, transmitted through conductors different from the nerves. The successive subordination of these several powers is shown during death, when the sensorial functions are the first to cease, and the animal no longer feels or wills, but yet the nervous power still continues to exist, as is proved by the nerves being capable, when stimulated, of exciting contractions in the muscles, both of voluntary and of involuntary motion, of producing the evolution

of caloric and of renewing the processes of secretion. In like manner the power of contraction, inherent in the muscular fibre, survives the destruction of both the sensorial and nervous powers, having an existence independent of either, although in the entire state of the functions they are subjected to the entire influence of both.

A difficulty here presents itself. If both the nervous and muscular powers be independent of the sensorial power, why, it may be asked, do the more perfect animals survive for so short a time the loss of the sensorial functions? This the author explains by the dependence of respiration on all the three powers,—the sensorial, nervous, and muscular, and its consequent cessation when either of these powers is withdrawn. In support of this view of the subject, he adduces various arguments to show that the muscles of respiration belong to the class of voluntary muscles, and that their action in performing that function is strictly voluntary, and the result of an impression made upon the sensorium by the want of fresh air in the lungs. These actions, though they have become automatic, are originally and essentially voluntary, and remain so even during apoplexy, as long as the breathing continues; but as soon as all sensibility is destroyed they necessarily cease, and death ensues. The phenomena are not explicable upon the hypothesis of a particular sympathy existing in the nerves distributed to the muscles subservient to respiration, and, if the above theory be adopted, require no other supposition for their explanation. As the organs supplied by the ganglionic nerves are subjected to the influence, not of any one but of every part of the brain and spinal cord, no inference respecting the sympathies of any of these nerves can be drawn, either from their particular origin or mode of distribution; and still less room can there be for such inferences in functions, where, as in respiration, the sensorial power is so materially concerned.

On the Respiration of Birds. *By* William Allen *and* William Hasledine Pepys, *Esqrs. Fellows of the Royal Society.* Read April 30, 1829. [*Phil. Trans.* 1829, *p.* 279.]

The inquiries of the authors on human respiration, and on that of the guinea pig, and of which they communicated the details to the Royal Society in former papers, are here extended to the respiration of birds. Pigeons were the subjects of these experiments, and the same apparatus was employed as the one used for the guinea pig, described in the Philosophical Transactions for 1809.

The object of the first experiment was to ascertain the changes which take place in atmospheric air when breathed by a bird in the most natural manner. For this purpose a pigeon was placed in a glass vessel containing 62 cubic inches of air, and commuuicating with two gasometers, one of which supplied from time to time fresh quantities of air, and the other received portions which become vitiated by respiration. The experiment lasted 69 minutes, and was productive of no injury to the bird excepting a slight appearance of uneasi-